The Action Agenda for Systemic Engineering Education Reform Guidelines for Submission of Proposals

Proposals must be received by ***March 31, 1998***
Next proposal deadline will be ***December 1, 1998***

National Science Foundation

NSF 98-27

Instructions for Submission of Cover Sheets of Action Agenda for Systemic Engineering Education Reform Proposals using NSF FastLane

If you are submitting your Action Agenda proposal using paper copies rather than electronically, you are required to submit the proposal cover sheet to NSF using FastLane. To access FastLane, go to the NSF Web Site, then select "FastLane" or go directly to FastLane.

Instructions for the Principal Investigator (PI):

- Begin your FastLane Action Agenda proposal cover sheet and budget information as early as possible.
- Contact your Sponsored Research Office (SRO) for a PIN number to gain access to the FastLane "Proposal Preparation" application.
- If you have not submitted a proposal to NSF in the past, you must contact your SRO to be added to the NSF PI database. Please do this as soon as you decide to prepare a Action Agenda proposal.
- As early as possible, enter your cover sheet and budget information using the FastLane "Proposal Preparation" application. In the field labeled "Program Announcement," type in "NSF 98-27" exactly as shown, with no additional spaces or characters.
- Click on the "Allow SRO Access" button. Allow time for your SRO to approve, copy and mail the proposal to meet the deadline. Contact your SRO to inform them of the proposal ID.
- If you save your forms as a "template," you can re-use the data on the forms in future proposals. (Once a proposal has been submitted, you can only view it.)
- Print the cover sheet (and budget, if desired) and insert into the printed copy of the proposal.

Instructions for the Sponsored Research Office:

- Print the second page of the cover sheet in time to obtain the required institutional signatures.
- Before assembling the proposal for copying, submit the cover sheet to NSF via FastLane using the "Submit Proposal" function within the "Institutional Management of FastLane" application. This will generate a proposal number. Allow at least a business day for this process.
- Print a copy of the cover sheet; it will have the proposal number on it.
- Substitute the first page of the cover sheet for the one produced by the PI.
- Make copies of the proposal and submit to NSF according to the usual procedures for a paper proposal. The hard copies of the proposal MUST be received at NSF by 5 p.m. Eastern time, March 31, 1998, in order to be eligible.

Direct questions concerning FastLane or problems utilizing FastLane to fastlane@nsf.gov. Direct Action Agenda program questions to the contact on page 8.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants for research and education in the sciences, mathematics and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Web Site at:

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NATIONAL SCIENCE FOUNDATION

The Action Agenda for Systemic Engineering Education Reform
Guidelines for Submission of Proposals

Background

As this century draws to a close, the environment for engineering practice is changing dramatically and irreversibly, impelled by the shift from defense to commercial competition as a major driver for engineering employment, the impact of exploding information technology on education and practice, the globalization of both manufacturing and service delivery, and the imperatives of environmental protection and sustainable development. Employers emphasize that success as an engineer increasingly requires, in addition to strong technical capability, skills in communication and persuasion, ability to lead and work effectively as a member of a team, understanding of the non-technical forces that profoundly affect engineering decisions, and a commitment to lifelong learning. Multiple reports over the past twelve years (1-24) show remarkable consistency in recommending these attributes for engineering graduates of the future.

Acquiring such characteristics is unlikely with traditional, lecture-based instruction. A new engineering education paradigm is needed, characterized by active, project based learning; horizontal and vertical integration of subject matter; introduction of mathematical and scientific concepts in the context of application; close interaction with industry; broad use of information technology; and a faculty devoted to developing emerging professionals as mentors and coaches.

NSF currently supports a variety of programs that address the new engineering education paradigm, including the Engineering Education Coalitions, Course and Curriculum Development (CCD), Institution-Wide Reform of Undergraduate Education in Science, Mathematics, Engineering, and Technology (IR), Instrumentation and Laboratory Improvement (ILI), Undergraduate Faculty Enhancement (UFE), Combined Research-Curriculum Development (CRCD), Research Experiences for Undergraduates (REU), Grant Opportunities for Academic Liaison with Industry (GOALI), Faculty Early Career Development (CAREER), Learning and Intelligent Systems (LIS), CISE Educational Innovation Program, Engineering Education Scholars Workshops, and the educational components of the Engineering Research Centers. NSF's investment in Engineering Coalition and Curriculum and Course Development activities totalled about $170 million over the period FY 1991-1997, substantial additional support was provided by the other programs listed. Additional funding through the Technology Reinvestment Project Manufacturing Education and Training Program (TRP/MET), provided from other agencies and administered through NSF, has totaled over $40 million. As a result, many innovative approaches to engineering education are now available in various stages of development, evaluation, and institutionalization. However, their widespread adoption throughout the engineering education community has been, in most cases, quite limited. Most observers agree that the current academic culture and reward system discourage development and implementation of educational innovations and the adoption of new educational paradigms.

Program Description

The *Action Agenda for Systemic Engineering Education Reform* described in this announcement seeks truly innovative approaches to break through this implementation barrier. In view of the broad avail-

ability of innovative educational models and materials already developed, it is expected that many projects will focus on the critical evaluation, dissemination, and institutionalization of such models and materials. At the same time, NSF values the rich experience and insight of the engineering education community and therefore does not wish to place strict constraints on the types of projects proposed. Accordingly, this program is outcomes-based and seeks proposals for effective actions to achieve specified Action Agenda Goals in ways that will affect significant numbers of engineering students.

Action Agenda Goals

The goals of the Action Agenda for Systemic Engineering Education Reform, to be addressed in proposals, are as follows.

A. Teaching and Learning Methods

Create a learning environment in which it can be clearly demonstrated that the faculty who participate in the engineering program: view themselves as mentors dedicated to nurturing and developing students; develop and use advanced educational materials founded in learning theory and cognitive sciences research that promote student-based learning; provide learning experiences that meet the needs of students with different learning styles; integrate their education and research roles; stress active, collaborative learning with less dependence on lectures; integrate subject matter by showing relationships from the beginning of the student's program; utilize emerging information technologies and network communications; and develop students' capability and motivation to engage in lifelong learning.

B. Curricular Content

Create engineering curricula, through a combination of learning experiences not limited to traditional course structures, that maintain a solid mathematical and scientific knowledge base and also: integrate subject matter by introducing fundamental principles in the context of applications; integrate the development of teamwork, communication, and group project definition and problem-solving skills in learning experiences throughout the curriculum; address issues of cost and timeliness, quality, social and environmental concerns, health and safety, etc., in the context of engineering practice; recognize diverse learning styles and career goals; increase opportunities for international experience, possibly taking advantage of distance learning technologies; and integrate research and education

C. Constituencies and Networks

Create an environment for the overall engineering education program that increases the successful participation of underrepresented groups in engineering through effective strategies for recruitment and for enhancing retention and progression to graduation; develops effective linkages with elementary and secondary education, two-year colleges, dual-degree programs, and other transfer institutions; maintains regular, well-planned interaction with industry; supports creation of a network of engineering education leaders; creates, maintains, and disseminates a body of evaluation findings; increases the incentives to department chairs, deans, and institutional administration to reward faculty who develop or implement successful innovations in teaching and learning; and reduces the time and cost required to earn an engineering degree.

Special emphasis will be placed on multiple goal achievement, firm institutional commitments to integrate the project results into ongoing educational programs, and the extent to which proposed projects go well beyond course development and modest curricular changes.

Project Characteristics

Action Agenda projects will vary in size, organization, and theme. The following are only a few examples of the types of projects that might be supported.

1. Adaptation and adoption of successful educational innovations to demonstrate their applicability and effectiveness in different types of institutions, and with different student populations, than those where they were developed.

2. Application of the best available knowledge on student learning to engineering education. Such projects might focus on one or more specific areas such as fundamental principles, integration of knowledge, design, leadership and team skills, ethics and professional responsibility, etc. Collaboration with experts on cognition and social processes in teaching and learning with engineering educators will be essential to assure application of latest understandings of how learning and creativity occur.

3. Focused development of high-quality, tested software -- for example, intelligent tutorial or virtual reality modules -- to support engineering education (integrated, where possible, with mathematics; physical, biological, and information sciences; humanities; and social sciences). Eligible projects should draw on the cognitive sciences, support multiple learning styles, track students' progress and give active feedback, actively help students identify specific learning needs, and enable the learning required to meet these needs. It is anticipated that such projects may be integrated with the Foundation-wide Knowledge and Distributed Intelligence (KDI) initiative, which includes Learning and Intelligent Systems (LIS).

4. Development of a user-friendly system for cataloging, peer-review, and retrieval of tested educational courseware, utilizing state-of-the-art information technology and building, insofar as possible, on existing electronic courseware data bases. Projects of this nature may be integrated with the future Digital Library Project, and partnering with other federal agencies and commercial publishers should also be considered.

5. New educational components for existing research awards that support the Action Agenda goals. These should focus on exciting ways of connecting the research to any level of education, but extend well beyond traditional courses or parts of such courses.

6. Institution-wide projects for comprehensive reform of all engineering curricula consistent with the Action Agenda Goals. Such projects might include the integration of engineering with mathematics; physical, biological, and information sciences; arts and humanities; and social and behavioral sciences, and facilitating the transition of students into engineering from pre-college and pre-engineering environments. It is expected that primary emphasis will be on the adaptation and adoption of existing educational innovations, rather than development of new educational models. An essential component of an institution-wide reform program would be an explicit strategy and commitment for faculty development and institutional policy to change the faculty culture and reward system.

7. Utilization of intern, co-op, work-study, learning factory, or similar programs in innovative ways to produce significant, measurable impacts on engineering education, with particular emphasis on increased diversity of graduates through strategies that may include formal mentoring, effective team functioning, structured faculty-student-employer interactions, enhanced distance learning, international work-study opportunities, and/or reduced time-to-degree.

8. Active partnerships with engineering employers and national laboratories are encouraged. Proposed projects may include contributions from disciplines such as mathematics; physical, biological, and information sciences; social and behavioral sciences; and arts and humanities that explicitly support learning experiences for engineering students. Interdisciplinary proposals are particularly encouraged.

It should be emphasized that these are only examples; any proposal that advances the objectives of the Action Agenda may be submitted.

Background information on current engineering education reform directions may be found in publications such as:

- Journal of Engineering Education
- ASEE Prism
- IEEE Transactions on Education
- Chemical Engineering Education
- ASCE Journal of Professional Issues in Engineering Education and Practice
- ASEE Annual Conference Proceedings
- Frontiers in Education Conference Proceedings

Information on recent and ongoing engineering education projects supported by NSF may be found by following the links for the various programs identified in the "Background" section of this announcement.

Points to Be Addressed in Proposals

All proposals must address, as a minimum, the following points.

- *Results of prior educational projects* funded by NSF for this principal investigator
- *Survey of relevant educational literature,* including applicable innovations in teaching and learning in engineering, basic sciences, and mathematics, explaining how such innovations will be utilized in the proposed program.
- *How the proposed innovations fits into the institution's current engineering curricula and expected impact of the innovation*: For example, if the proposal involves new or modified courses, please include a table with the following information displayed in columns for each year of the project: Institution/Department; Course Number and Title; Level (freshman, sophomore, junior, senior, graduate); Required or Elective; Number of Students Expected to Enroll per Term; Frequency of Course Offering; Brief Explanation of the Contribution of the Innovation to the Student's Educational Experience.
- *How the proposed innovations relate to existing NSF or other federally funded (e.g., FIPSE) projects* for the engineering education programs at the institution.
- *Evaluation of Project Results*: All projects funded under the Action Agenda must employ modern evaluative models to monitor and assess systematically the achievement of Action Agenda goals. This evaluation must facilitate identification of successes and subsequent replication elsewhere.

Evaluations should concentrate on long-term student retention and use of learning in subsequent courses and in employment. A major criterion in proposal evaluation will be the strength of the evaluation system proposed. This system must include, as a minimum, *measurable* objectives (for example, objectives for student learning, retention, and progression to graduation in engineering); procedures to measure their achievement; and a system for monitoring the progress of the project in relation to these measures. In order to develop effective measures for evaluation, cooperation with persons experienced in educational assessment and evaluation is strongly encouraged. Reliable evaluation usually requires multiple measures. NSF resource materials are available to assist institutions in developing and implementing a sound educational assessment program, including reports of the EHR Division of Research, Evaluation, and Communication (25), and engineering education evaluation workshops funded by the ENG Division of Engineering Education and Centers (26). The Foundation may also request the cooperation of individual projects in the collection of specific data via survey or other mechanisms to enable evaluation of the combined effect of its engineering education programs.

- *Dissemination of Project Results*: To achieve the desired national impact, project results must be evaluated and then disseminated widely within the engineering education community. Plans for dissemination of project results, including the probable size of the audience to be influenced and the potential for lasting impact, are given significant weight in the review of proposals. A dissemination plan should include identification of the target audience, including its nature and probable size; a description of the information and material to be disseminated; the means of dissemination; and procedures for determining the success of the dissemination effort. Preference will be given to proposals that include provisions for active participation by the recipients and follow-up. Proposers are encouraged to describe existing or planned arrangements with commercial vendors of educational materials. Multiple dissemination approaches are strongly encouraged.

- *A milestone chart* showing development, pilot studies, implementation, evaluation, dissemination, and completion of deliverables.

Further information is given in the "Proposal Guidelines and Format" section of this announcement. The Division of Undergraduate Education publication, A Guide to Proposal Writing (NSF 97-83), may be helpful in developing the proposal.

General Program Information

Eligibility

Eligibility to submit proposals is specified in the NSF Grant Proposal Guide (GPG) (NSF 98-2), Chapter I.

Proposed projects may include contributions from disciplines such as mathematics; physical, biological, and information sciences; social and behavioral sciences; and arts and humanities that explicitly support learning experiences for engineering students. Interdisciplinary proposals are particularly encouraged.

Merit Review

The deadline for proposal submission is **5:00 pm Eastern Standard Time, March 31, 1998**. In selecting awards for this competition, the Foundation will be assisted by reviewers who have a strong

interest in engineering education drawn from the academic and engineering communities. Proposals will be evaluated based on the NSF Merit Review Criteria as applied to this program. Additional questions to be addressed under the two principal Criteria are:

Under Criterion 1: What is the intellectual merit and quality of the proposed activity?

1. To what degree does the proposed project address the Action Agenda Goals set forth in the program announcement?
2. How well conceived and organized is the proposed project?
3. What are the demonstrated capabilities of the project team, their understanding of the issues involved in systemic engineering education reform, their access to needed resources, and their commitment to the accomplishment of the effort?
4. Is there a robust evaluation system that demonstrates achievement of the Action Agenda Goals?

Under Criterion 2: What are the broader impacts of the proposed activity?

1. What is the likelihood of sustained impact on educational processes, diversity of graduates, and institutional culture after NSF funding ends?
2. What is the probable impact of the project results and the proposed dissemination process on the broader engineering education community?

Length of Awards and Anticipated Funding Levels

The award period will normally be one, two, or three years. Award size is expected to range from $100,000 to $600,000 per year for up to three years.

Awardees will be expected to participate in an annual, two-day grantees conference for the Action Agenda program in the Washington, DC, area. Therefore, travel funds should be budgeted for these meetings.

Cost Sharing

Cost sharing is expected but not required. Cost-sharing commitments will be a factor in proposal evaluation. The cost sharing may come from any private or non-Federal public source and may be in cash or in-kind, fairly valued. For examples of eligible cost sharing see OMB Circular A-110, Section C, Subpart 21.

Cost sharing from industry or other organizations is strongly encouraged though not required, and the details should be included as an attachment to the proposed budget.

Cost sharing specified in the proposal will be referenced and included as a condition of any award under this program.

Proposal Guidelines and Format

A. General: Proposals must be prepared in accordance with the NSF Grant Proposal Guide (GPG) (NSF 98-2) and **the instructions in these Guidelines**. All forms specified below are available in GPG and must be used when specified in GPG. Appendix A of GPG indicates the required number of

copies of proposals, including the original signed copy. The proposal format should follow the sequence below.

- List of suggested reviewers or reviewers not to include, optional (with original copy only) (Refer to GPG, Section II.B.1).
- Information about Principal Investigators/Project Directors (NSF Form 1225) (**with original copy only**).
- Cover Sheet (NSF Form 1207) (**page 1 all copies; pages 1 and 2, original copy only**). This form should be signed by the Principal Investigator(s) and an official authorized to commit the institution in business and governmental affairs, with EEC listed as the NSF Organizational Unit and the Action Agenda for Systemic Engineering Education Reform Announcement Number NSF 98-27 listed as the Program Announcement Number in the upper-left hand corner of the form.

Anyone submitting an Action Agenda proposal using paper copies rather than electronic submission is required to prepare and submit the cover sheet using **NSF** FastLane. This will facilitate tracking the proposal. Instructions are given on the page ii of this announcement.

- Project Summary (not to exceed one page). This summary is used by the Foundation to inform the public about projects supported and therefore should be understandable to the informed lay reader. It should be a self-contained description of the educational results that would be achieved if the project is funded, including their objectives, methods to be employed, and significance.
- Table of Contents (NSF Form 1359). Note that the pages are to be numbered consecutively within each Section.
- Project Description (Including Results from Prior NSF Support). A narrative consisting of no more than 15 typed pages, (including tables, figures, and other visual supplements) describing the proposed project in sufficient detail to enable full review and addressing the specific points identified earlier in this announcement. Standard letter-size paper, 2.5 cm margins, and a font of 10 to 12 points must be used. Line spacing (single-spaced, double spaced, etc.) is at the discretion of the proposer, however established page limits must be followed. **If the proposal exceeds the page limit for text it will be returned without review.** See GPG, Chapter II, for further information.
- References Cited: See GPG, Chapter II, for further information.
- Budget (NSF Form 1030): Provide a summary budget for the total award period, and budgets showing annual costs for each of the years requested.
- Appendices (not part of the page limit):

  Include the following items **ONLY**:

  - Biographical sketches: A curriculum vitae for each of the principal investigators and co-principal investigators involved in the project (maximum length, two pages each). These should be complete enough to demonstrate the expertise necessary to conduct the proposed project. Please include a statement, no longer than one page, for each principal investigator and co-principal investigator describing their specific roles in the project.
  - Letter of institutional and academic departmental commitment to implement the project results signed by the Dean of the Engineering School (or comparable administrator). **Please note that the proposal will not be reviewed without this letter.**

- Current and Pending Support (NSF Form 1239): Include this form for the Principal Investigator and co-Principal Investigators.

Proposals must not contain other appendices or supporting material. No videotapes, diskettes, textbooks, CD-ROMs, or World Wide Web sites will be accepted. Proposals not adhering to the guidelines set forth above will be returned to the Principal Investigator without review.

B. Deadline for Proposal Submission: Ten (10) copies of the proposal must be received at the following address by **5 p.m., Eastern Standard Time, Tuesday, March 31, 1998.**

Announcement No. NSF 98-27; ENG Action Agenda Program
Proposal Processing Unit (PPU), Room P60
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

One information copy **must** be sent to Dr. Ernest Smerdon at Room 585, NSF/EEC, 4201 Wilson Boulevard, Arlington, VA 22230. Proposals submitted in response to this announcement that are received after the deadline date will be returned without review.

FAX copies of proposals will not be accepted; any that are received will be returned without review.

Inquiries

Inquires should be directed to the Action Agenda Program Coordinator

Dr. Ernest Smerdon **(beginning January 1, 1998)**
Dr. John W. Prados **(until December 31, 1997)**
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e-mail: jprados@nsf.gov

Administration of Grants

Grants awarded as a result of this announcement will be administered in accordance with the terms and conditions of Grant General Conditions (NSF GC-1), or Federal Demonstration Partnerships (FDP-III). More comprehensive information is contained in the NSF Grant Policy Manual (NSF 95-26).

References

1. "Engineering Education and Practice in the United States," National Academy Press, 1985.
2. "Undergraduate Science, Mathematics, and Engineering Education," National Science Board, NSB 86-100, 1986.
3. “Quality of Engineering Education,” Final Report of the Quality of Engineering Education Project, American Society for Engineering Education, September 1986.
4. "Engineering Education Answers the Challenges of the Future," Proceedings of the National Congress on Engineering Education, Accreditation Board for Engineering and Technology, Inc., November 1986.
5. "A National Action Agenda for Engineering Education," Report of an ASEE Task Force (E. E. David, Jr., Chair), American Society for Engineering Education, 1987.
6. "Workshop on Engineering - April 1988," Report of the NSF Disciplinary Workshops on Undergraduate Education, pp. 51-55, NSF 89-3, National Science Foundation, 1989.
7. Karl Willenbrock *et al.*, "Imperatives in Undergraduate Engineering Education: Issues and Actions," Report of an NSF *Ad Hoc* Task Force, August 1989 ("the Belmont Conference").
8. "Education and Continuing Development of the Civil Engineer," Proceedings of an ASCE National Forum, 17-20 April 1990, American Society for Civil Engineers, 1990.
9. Roland W. Schmidt, Letter Report to E. W. Ernst of an NSF-Sponsored NAE Workshop on "Engineering, Engineers, and Engineering Education in the 21st Century," 9 May 1990.
10. "An Engineering Look Forward: New Decade, New Century, New Millennium," Proceedings of the 1990 ABET Annual Meeting, 17-18 October 1990, Accreditation Board for Engineering and Technology, Inc.
11. “America’s Academic Future,” Report of the Presidential Young Investigator Colloquium on U.S. Engineering, Mathematics, and Science Education for the Year 2010 and Beyond, NSF 91-150, National Science Foundation, 1992.
12. “Engineering Education Issues: Report on Survey of Opinions by Engineering Deans and Employers of Engineering Graduates on First Professional Degree,” NSPE Professional Engineers in Education Sustaining University Program, NSPE Publication 3059, National Society of Professional Engineers, November 1992.
13. Joseph Bordogna, Eli Fromm, and Edward Ernst, “Engineering Education: Innovation Through Integration,” *Journal of Engineering Education*, Vol. 82, No. 1, pp. 3-8 (1993)
14. Harris, Eugene M. DeLoatch, William R. Grogan, Irene C. Peden, and John R. Whinnery, "Journal of Engineering Education Round Table: Reflections on the Grinter Report," *Journal of Engineering Education*, Vol. 83, No. 1, pp. 69-94 (1994) (includes as an Appendix the Grinter Report, issued in September, 1955).
15. "Engineering Education for a Changing World," Report of a Joint Project of the ASEE Engineering Deans Council and Corporate Roundtable, American Society for Engineering Education, 1994.

16. “Industry 2000: Technical Vitality Through Continuing Education,” Report of a workshop conducted by the IEEE Educational Activities Board in May 1994, Institute of Electrical and Electronics Engineers, Inc., 1995.

17. "Restructuring Engineering Education: A Focus on Change," Report of an NSF Workshop, NSF 95-65, National Science Foundation, 1995.

18. "Engineering Education: Designing an Adaptive System," Report of the NRC Board on Engineering Education, National Research Council, 1995.

19. John H. McMasters and James D. Lang, "Enhancing Engineering and Manufacturing Education: Industry Needs, Industry Roles," presented at the 1995 ASEE Annual Conference and Exposition, June 25-28 1995, American Society for Engineering Education.

20. “Systemic Engineering Education Reform: An Action Agenda,” Report of a Workshop Convened by the NSF Directorate for Engineering, NSF 96-63, National Science Foundation, 1996.

21. “Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology,” Report of the Review of Undergraduate Education by the Advisory Committee to the NSF Directorate for Education and Human Resources, NSF 96-139, National Science Foundation, 1996.

22. Sir John Daniel, “Why Universities Need Technology Strategies,” *Change*, July-August 1997, pp. 11-17.

23. Joseph Bordogna, “Making Connections: The Role of Engineers and Engineering Education,” *The Bridge*, Spring 1997, pp. 11-16

24. “Engineering Criteria 2000,” 2nd Edition, Engineering Accreditation Commission, Accreditation Board for Engineering and Technology, Inc, Baltimore, MD, 1997

25. Floraline Stevens *et al*., “User-Friendly Handbook for Project Evaluation: Science, Mathematics, Engineering, and Technology Education,” NSF Division of Research, Evaluation, and Communications, Directorate for Education and Human Resources, NSF 93-152, National Science Foundation, 1993 (reprinted in 1996).

26. Gloria M. Rogers and Jean K. Sando, “Stepping Ahead: An Assessment Plan Development Guide,” Report of an NSF-Supported Workshop on Outcomes Assessment, Rose-Hulman Institute of Technology, Terre Haute, IN, 1996.

About the National Science Foundation

The National Science Foundation (NSF) is an independent Federal agency, created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). Its aim is to promote and advance scientific and engineering progress in the United States (U.S.). The Foundation is also committed to ensuring the nation's supply of scientists, engineers, and science educators.

NSF funds research and education in most fields of science and engineering. It does this through grants, contracts, and cooperative agreements to more than 2,000 colleges, universities and other research and/or education organizations in all parts of the U.S. NSF receives approximately 30,000 proposals annually for new or renewal support for research, graduate and postdoctoral fellowships, and math/science/engineering education projects, and makes approximately 9,000 new awards. These typically are awarded to universities, colleges, academic consortia, non-profit institutions and small businesses. The agency operates no laboratories itself but does support National Research Centers, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry and U.S. participation in international scientific efforts.

NSF is generally structured by fields of science and engineering and science education but also considers activities that cross traditional fields by coordinating review across the Foundation. The NSF's staff is assisted by advisors, primarily from the scientific and engineering communities, who serve on panels or as mail reviewers of proposals. NSF Program Officers who are experts in the field or area of the proposal are responsible for award recommendations.

Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals on behalf of all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to participate fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. (For more information, see Section V.G. of the Grant Proposal Guide, NSF 98-2).

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation regarding NSF programs, employment or general information. To access TDD phone (703) 306-0090; FIRS 1-800-877-8339.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers as part of the application review process;

to applicant institutions/grantees to provide or obtain data regarding the application review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as NSF reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 60 Federal Register 4449 (January 23, 1995), and NSF-51, "Reviewer/Proposal File and Associated Records," 59 Federal Register 8031 (February 17, 1994). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Gail A. McHenry
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

Activities described in this publication are in the Catalog of Federal Domestic Assistance Number 47.041, Engineering; 47.070, Computer and Information Science and Engineering; 47.076, Education and Human Resources.

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